Fig.1

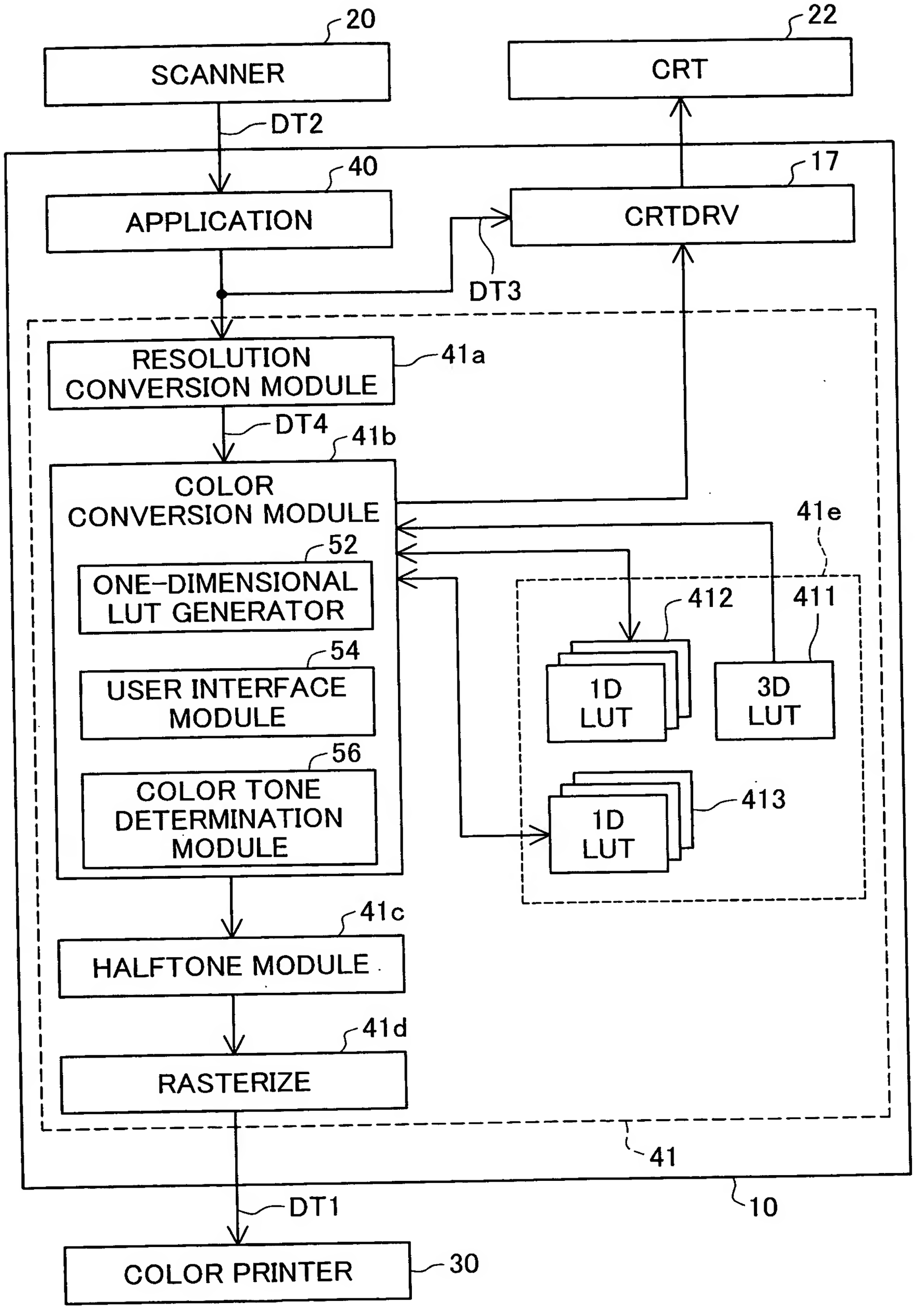

20
SCANNER
22
CRT
DT2
40
APPLICATION
17
CRTDRV
DT3
RESOLUTION CONVERSION MODULE
41a
DT4
41b
COLOR CONVERSION MODULE
41e
52
ONE-DIMENSIONAL LUT GENERATOR
412
411
1D LUT
3D LUT
54
USER INTERFACE MODULE
56
COLOR TONE DETERMINATION MODULE
413
1D LUT
41c
HALFTONE MODULE
41d
RASTERIZE
41
10
DT1
COLOR PRINTER
30

Fig.2

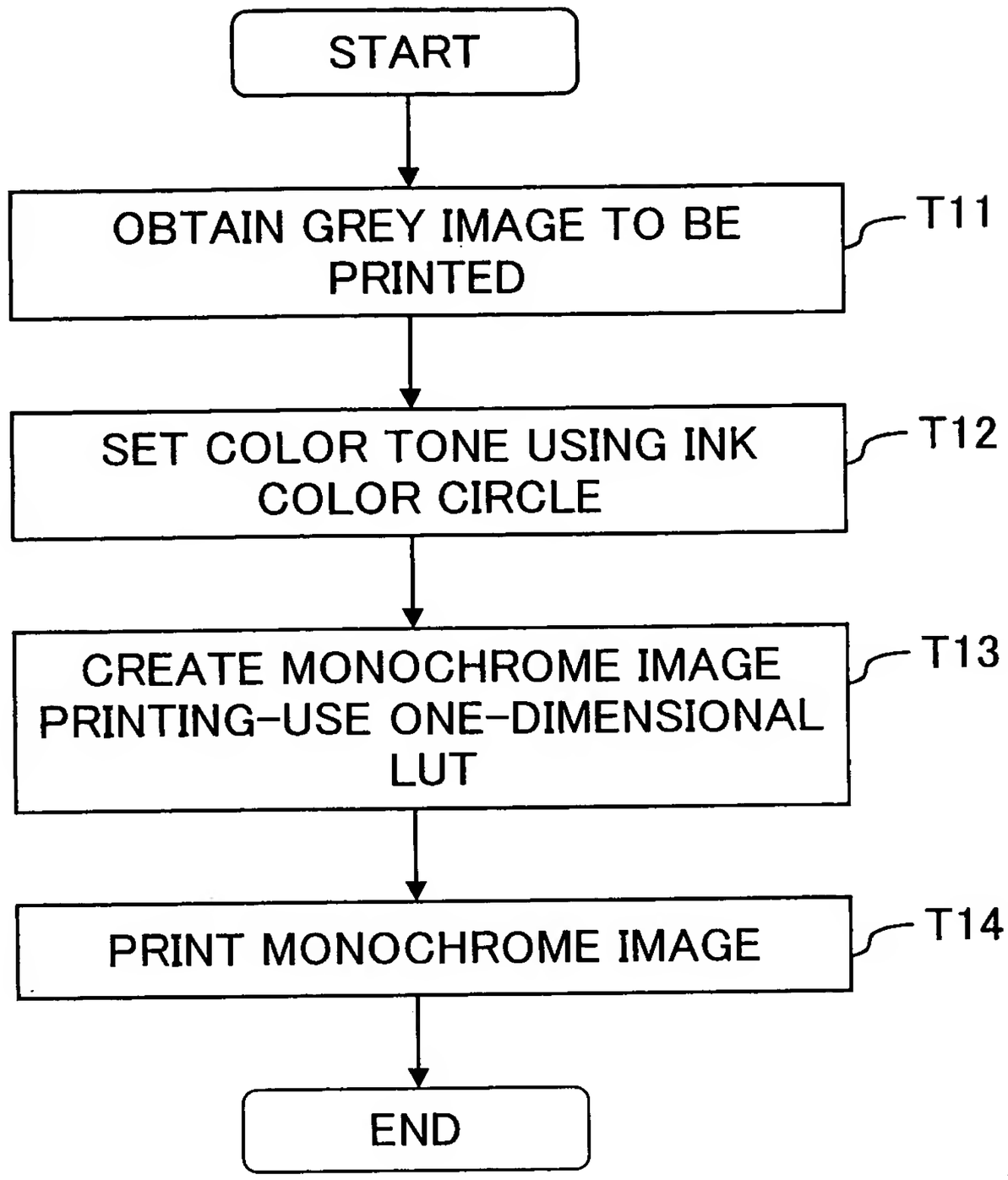

START
OBTAIN GREY IMAGE TO BE PRINTED
T11
SET COLOR TONE USING INK COLOR CIRCLE
T12
CREATE MONOCHROME IMAGE PRINTING-USE ONE-DIMENSIONAL LUT
T13
PRINT MONOCHROME IMAGE
T14
END

Fig.3A

Image to be printed

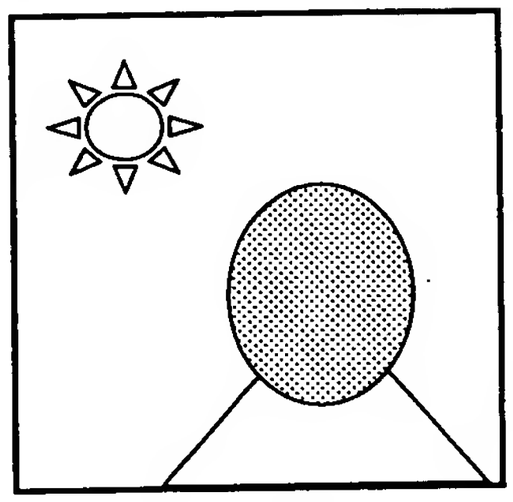


Fig.3B

Color tone setting

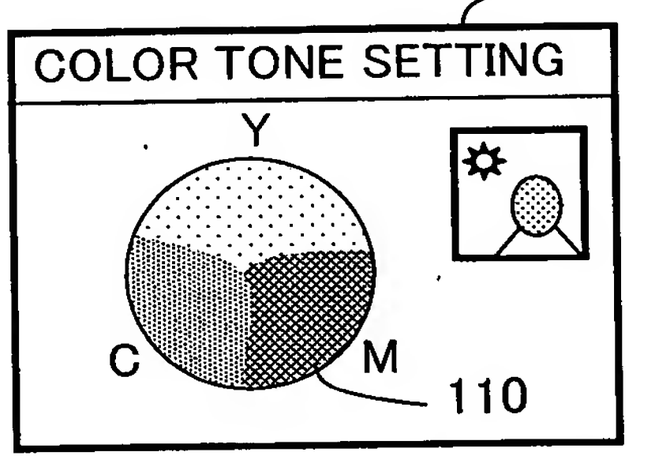


Fig.3C

Reference one-dimensional LUT 412

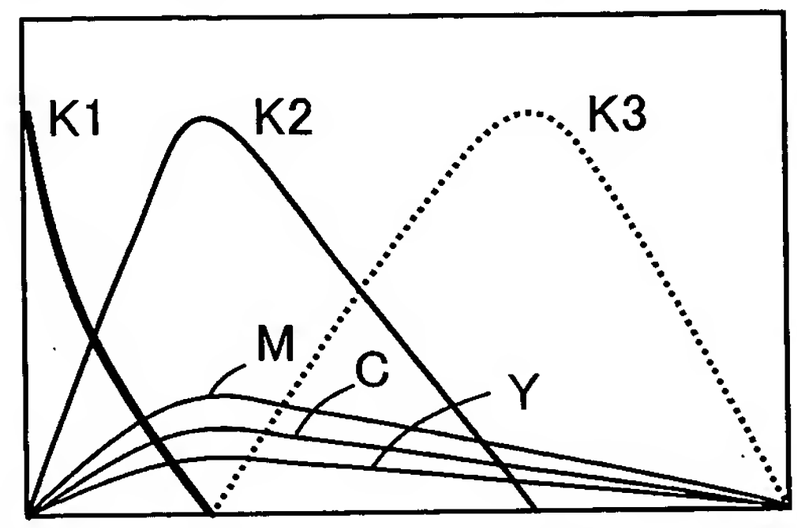


Fig.3D

Monochrome image printing-use one-dimensional LUT 413

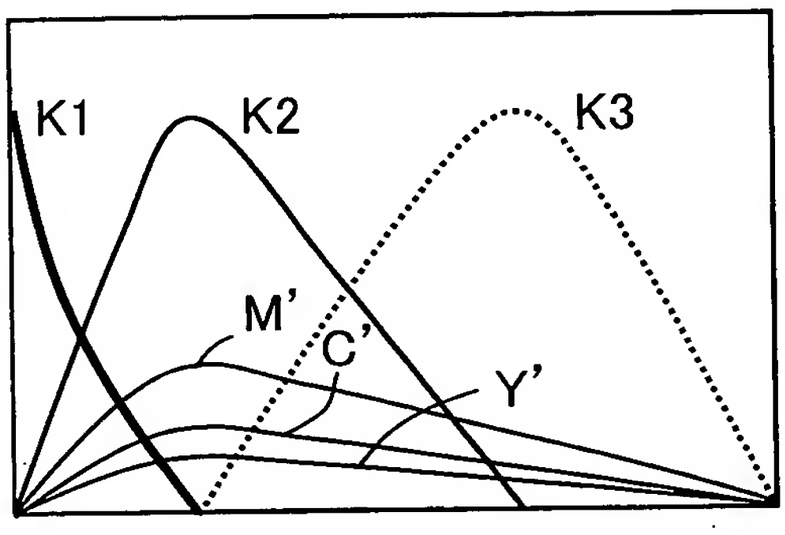
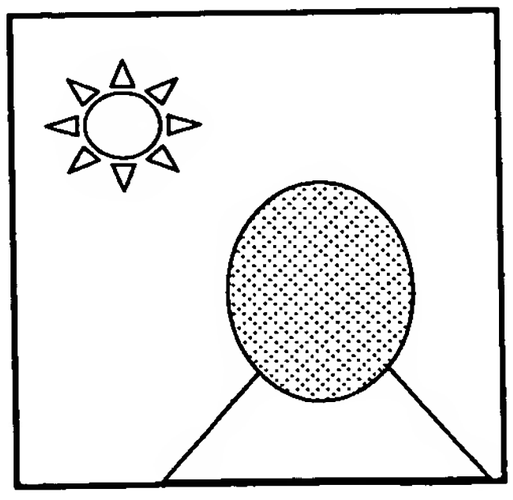


Fig.3E

Monochrome image printing



$C' = C \times (Cv / Cmax)$
$M' = M \times (Mv / Mmax)$
$Y' = Y \times (Yv / Ymax)$

Fig.4

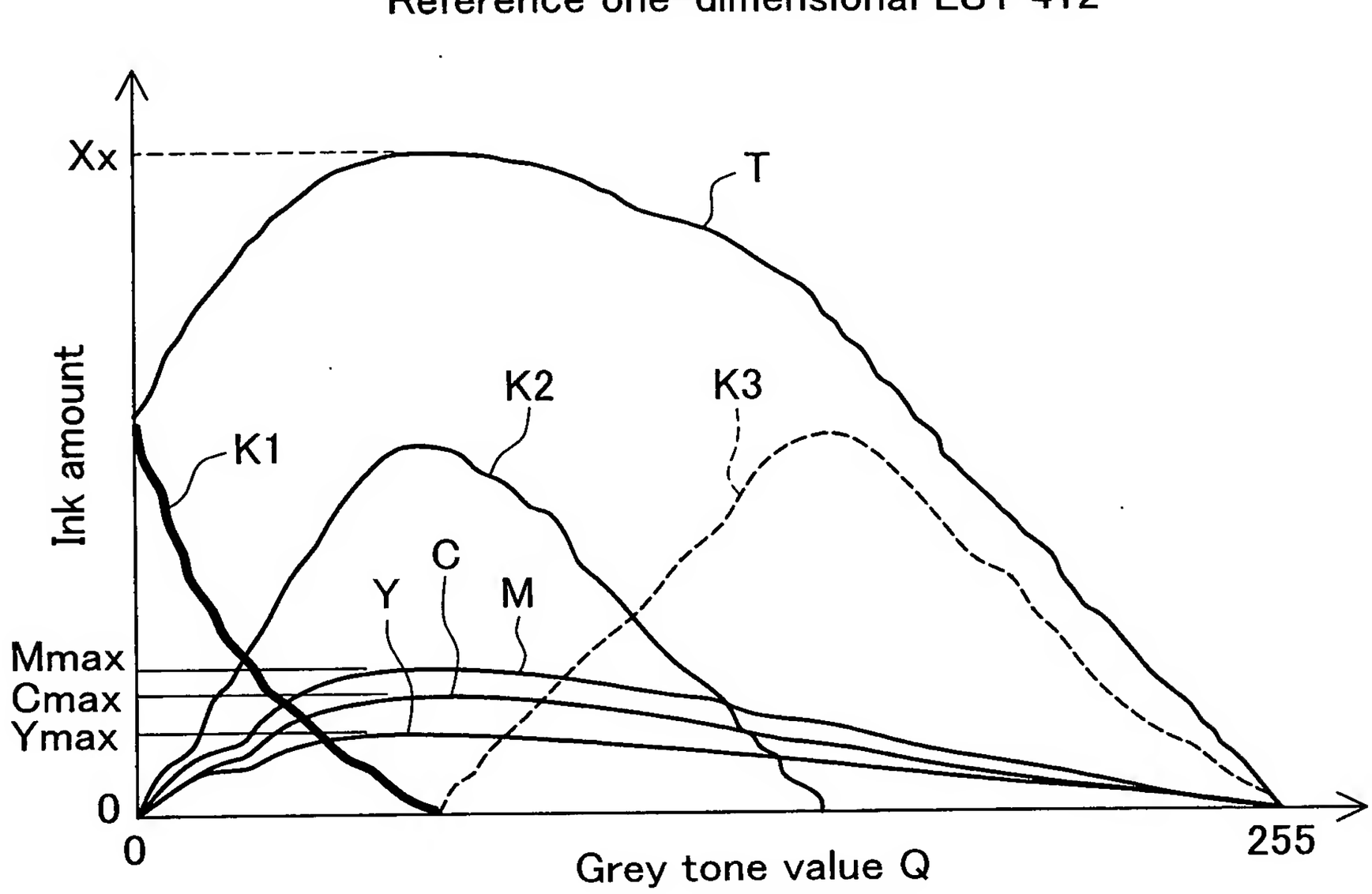

Reference one-dimensional LUT 412
Xx
T
K2
K3
K1
C
Y
M
Mmax
Cmax
Ymax
0
0
255
Ink amount
Grey tone value Q

Fig.5

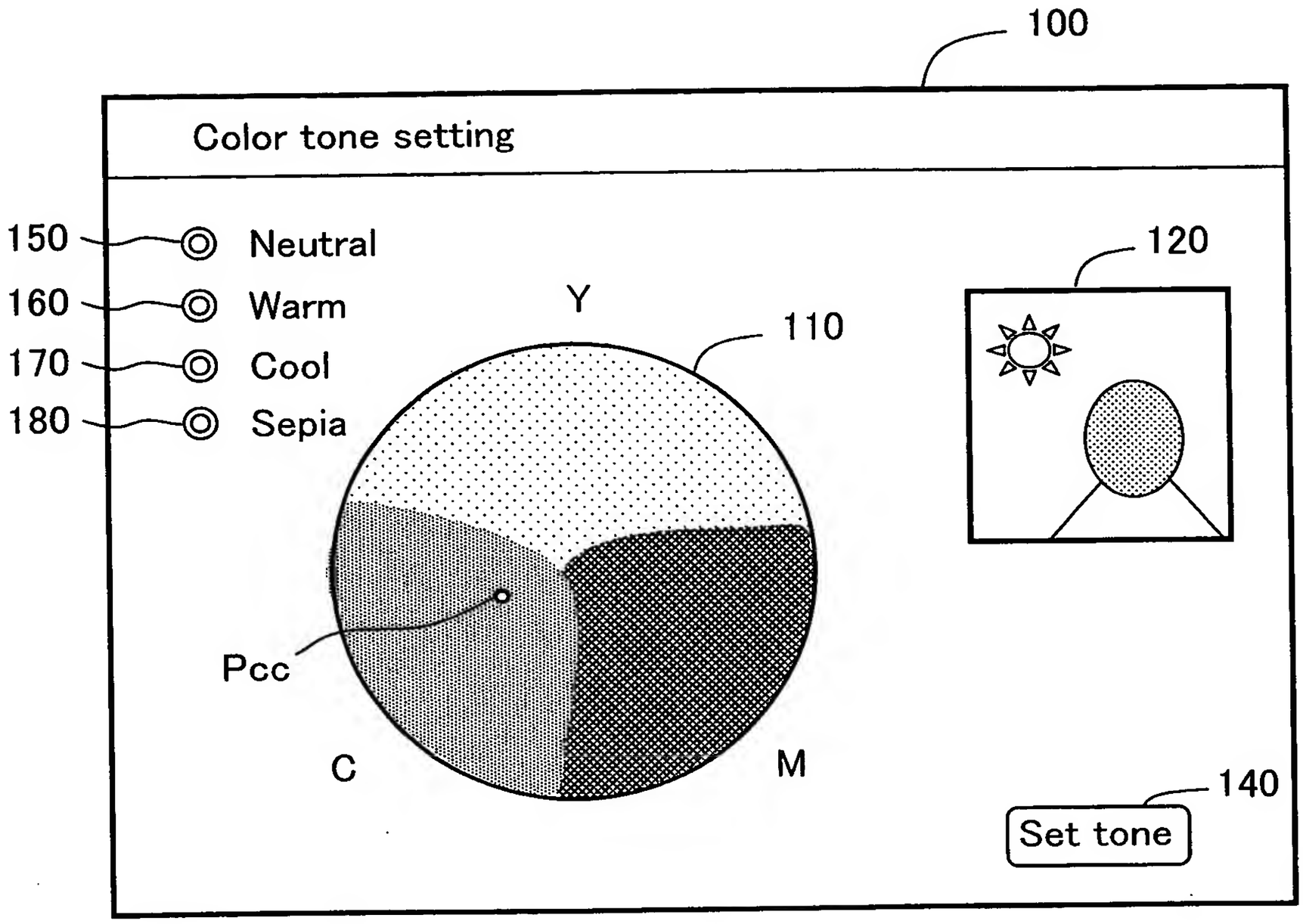
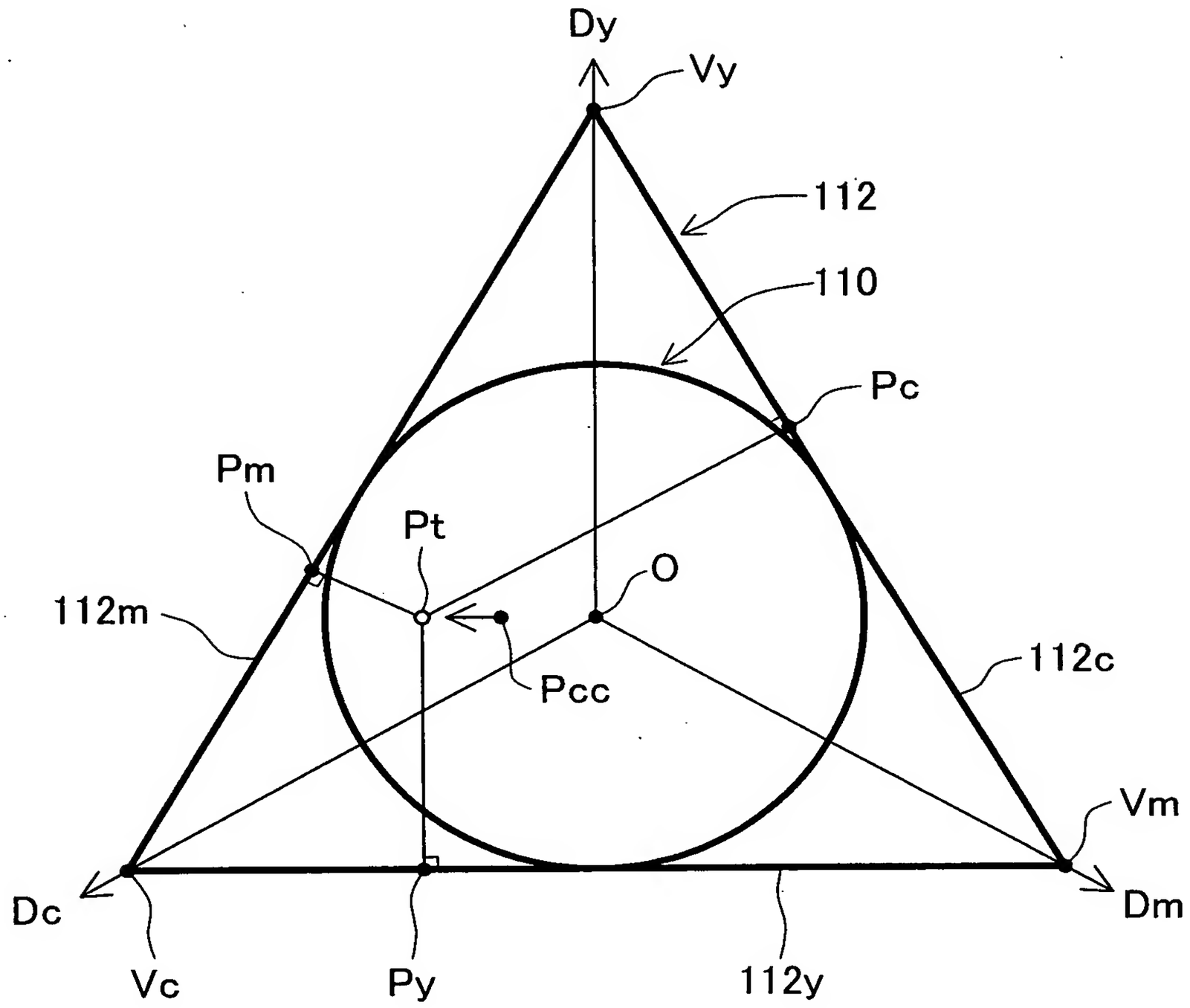

100
Color tone setting
150
Neutral
160
Warm
170
Cool
180
Sepia
Y
110
120
Pcc
C
M
140
Set tone

Fig.6



Color component intensity values Ic, Im, Iy for a point Pt corresponding to an arbitrary point Pcc in ink color circle:

$$Ic = \frac{Qc}{Qc + Qm + Qy}$$

$$Im = \frac{Qm}{Qc + Qm + Qy}$$

$$Iy = \frac{Qy}{Qc + Qm + Qy}$$

$$Qc = \overline{PtPc}\,,\ Qm = \overline{PtPm}\,,\ Qy = \overline{PtPy}$$

Fig.7A

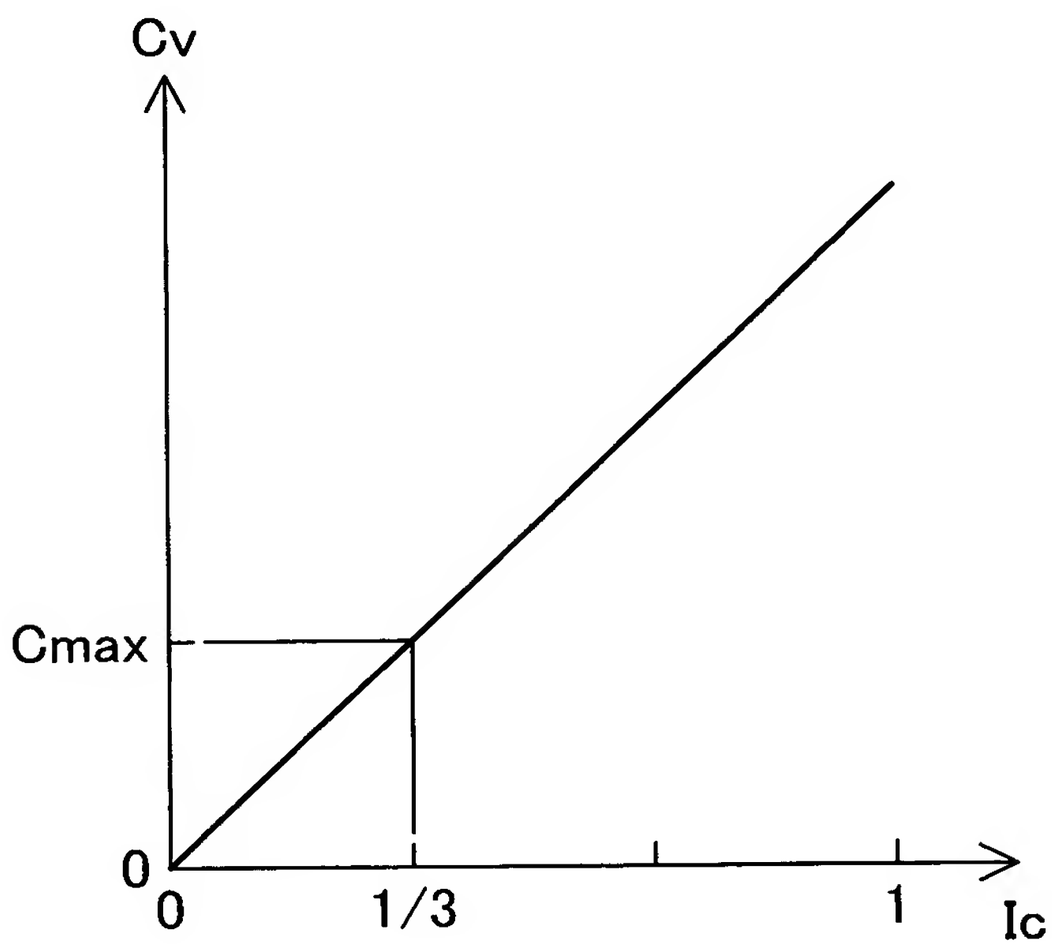

Relationship between color component intensity value Ic and tone adjustment value Cv
Cv
Cmax
0
0
1/3
1
Ic

Fig.7B

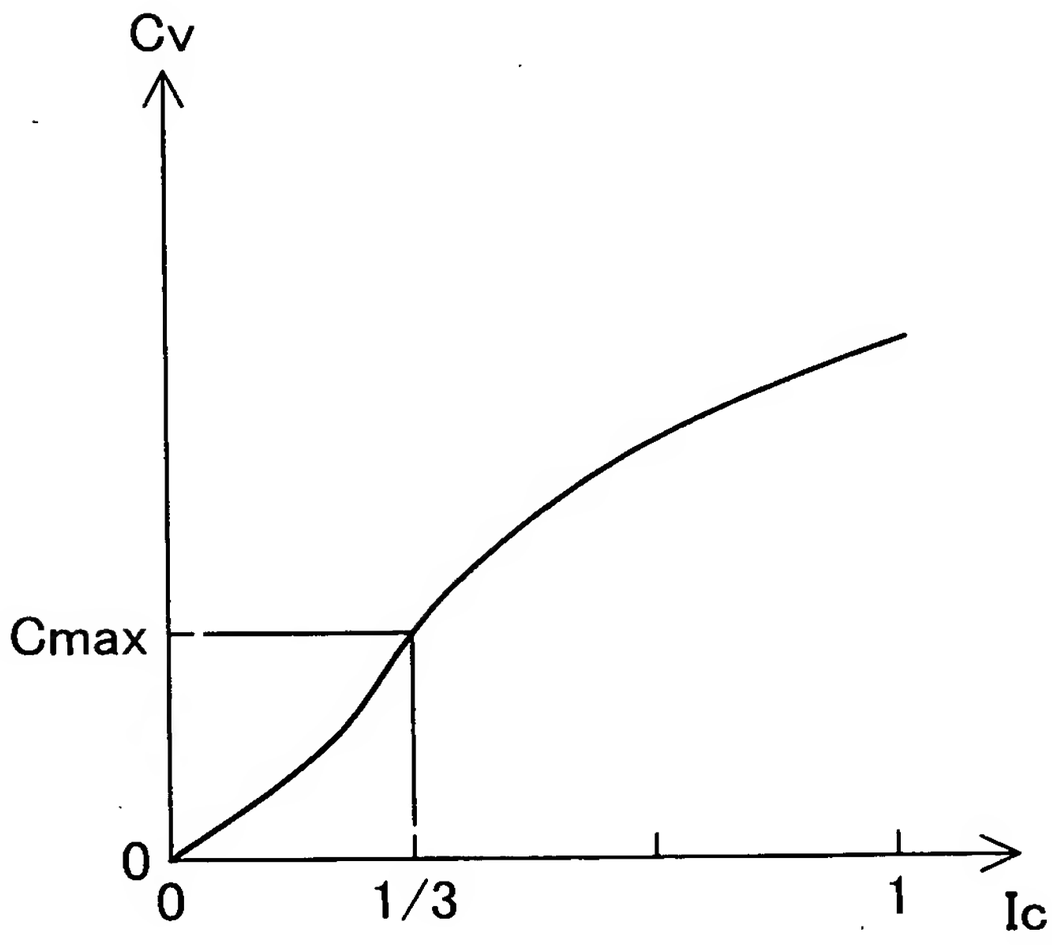

Cv
Cmax
0
0
1/3
1
Ic

Fig.8

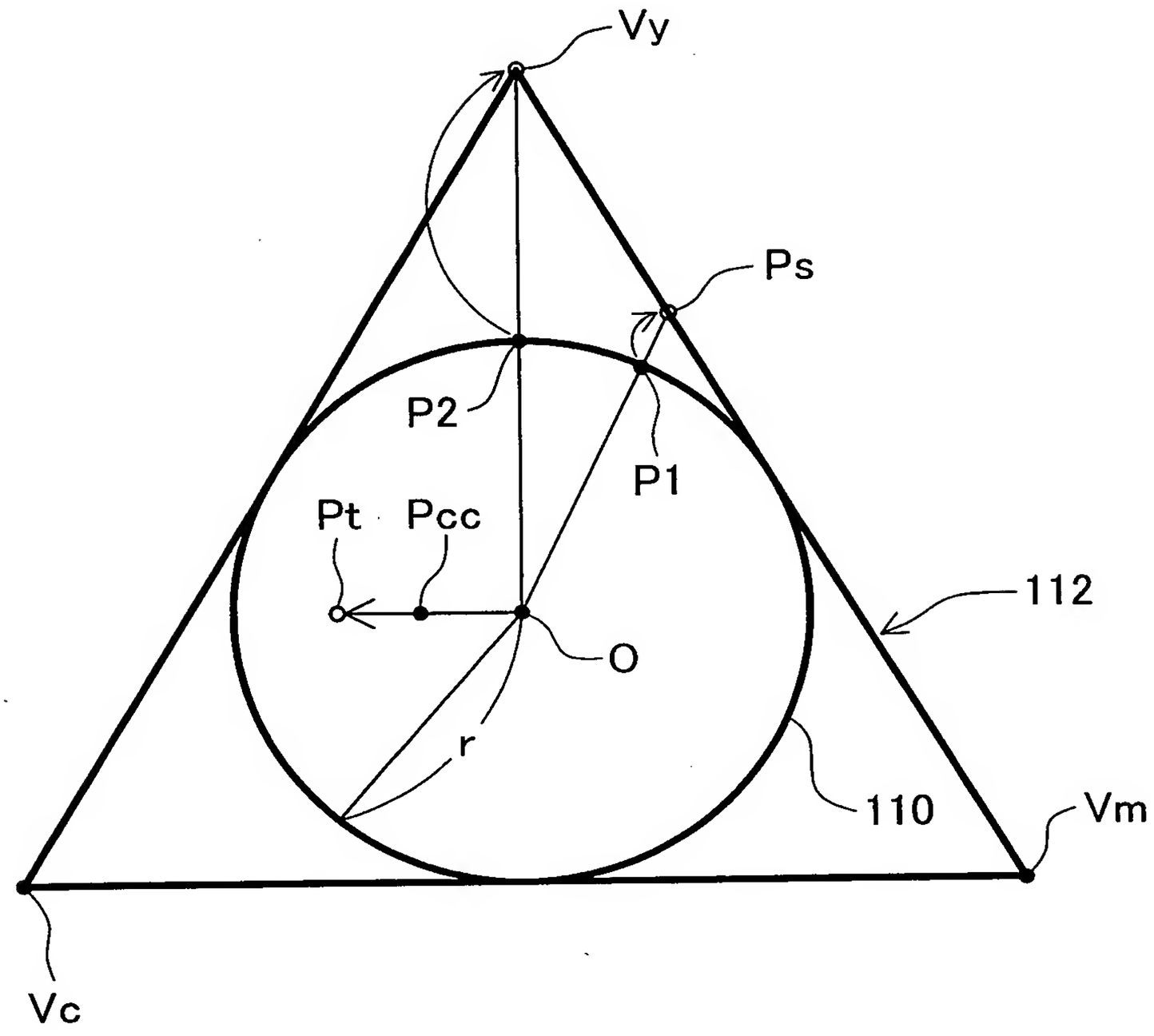


Fig.9A

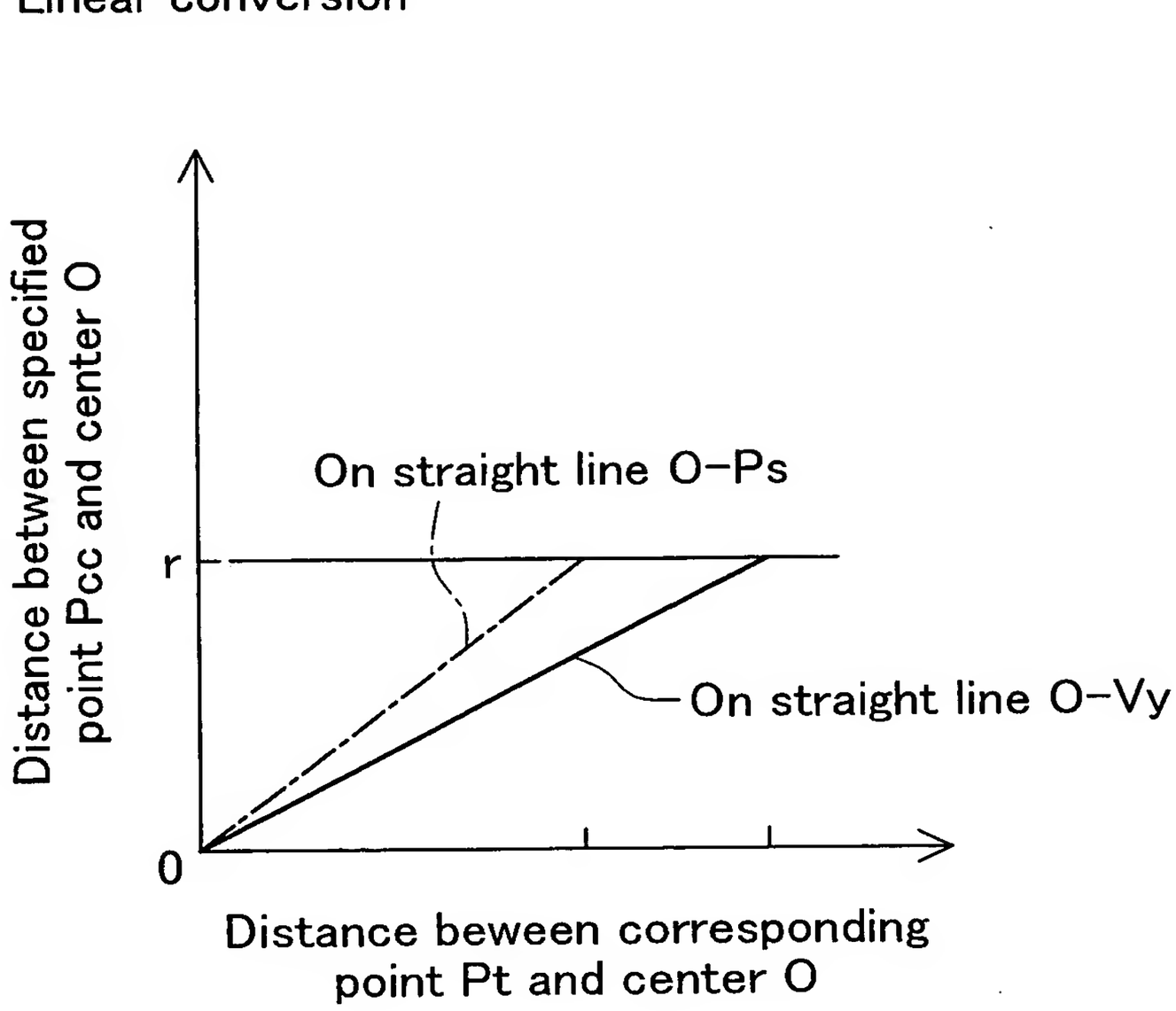

Linear conversion
Distance between specified point Pcc and center O
On straight line O–Ps
r
On straight line O–Vy
0
Distance beween corresponding point Pt and center O

Fig.9B

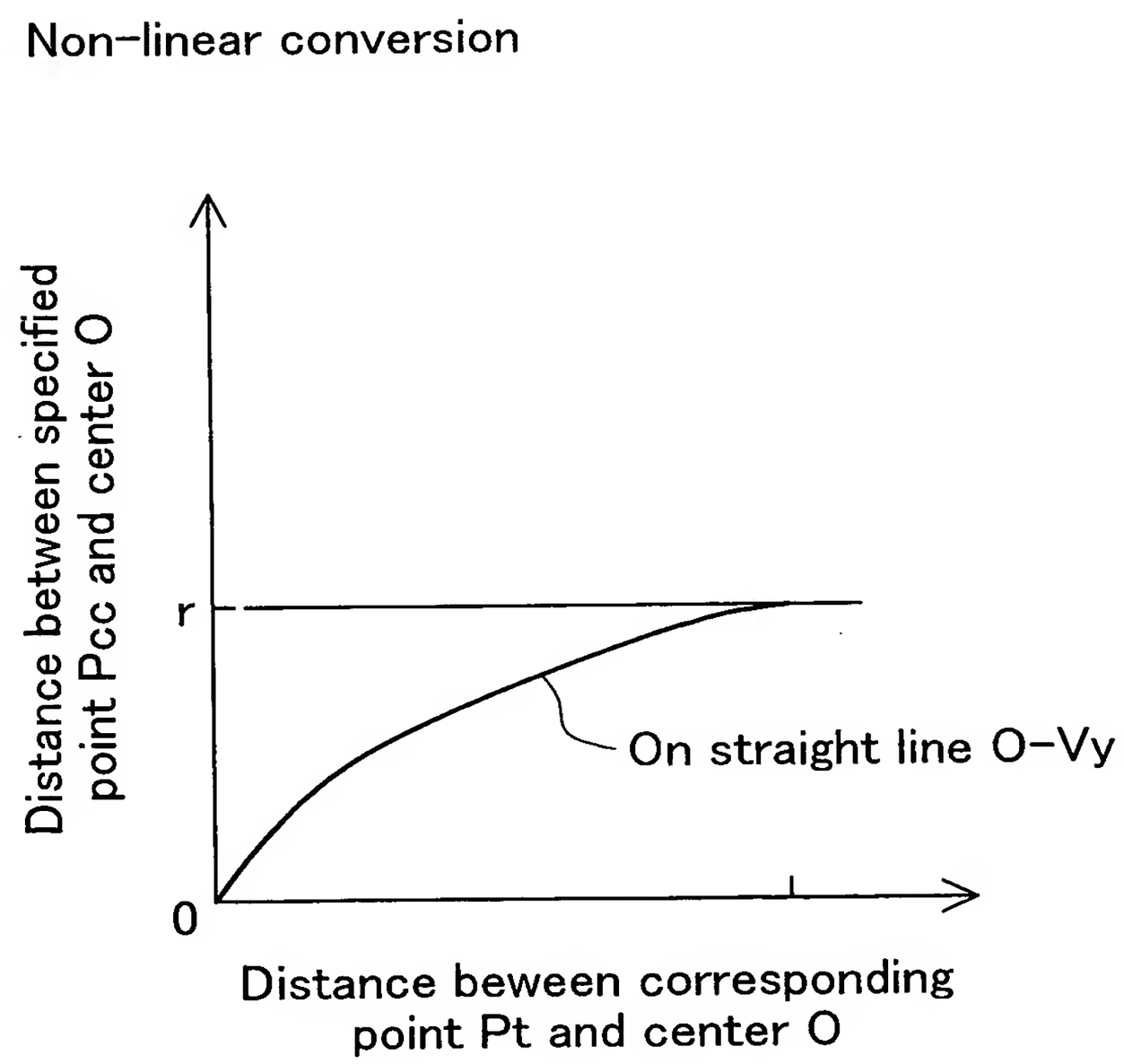
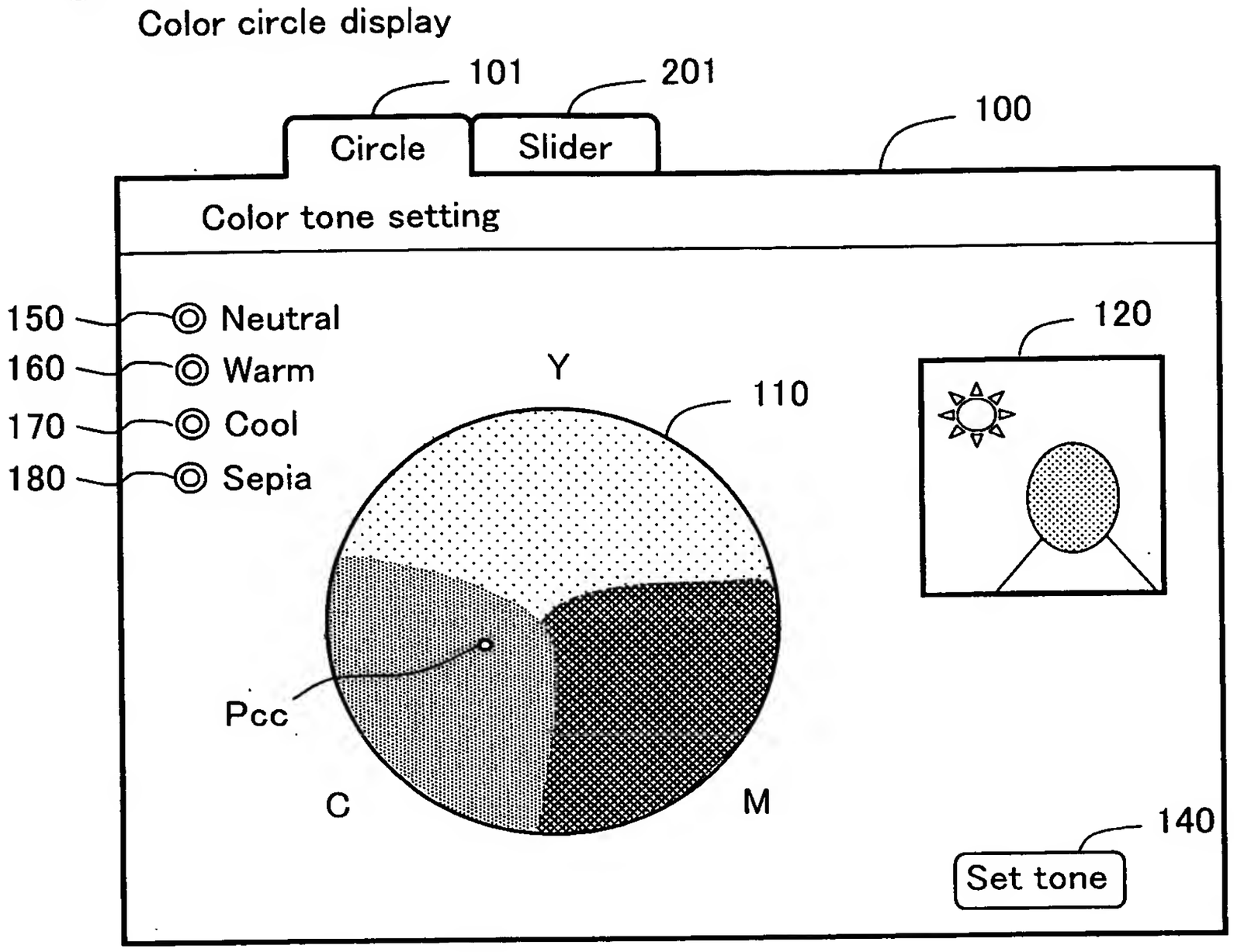

Non–linear conversion
Distance between specified point Pcc and center O
r
On straight line O–Vy
0
Distance beween corresponding point Pt and center O

Fig.10A



Permissible

Non-permissible

Fig.10B

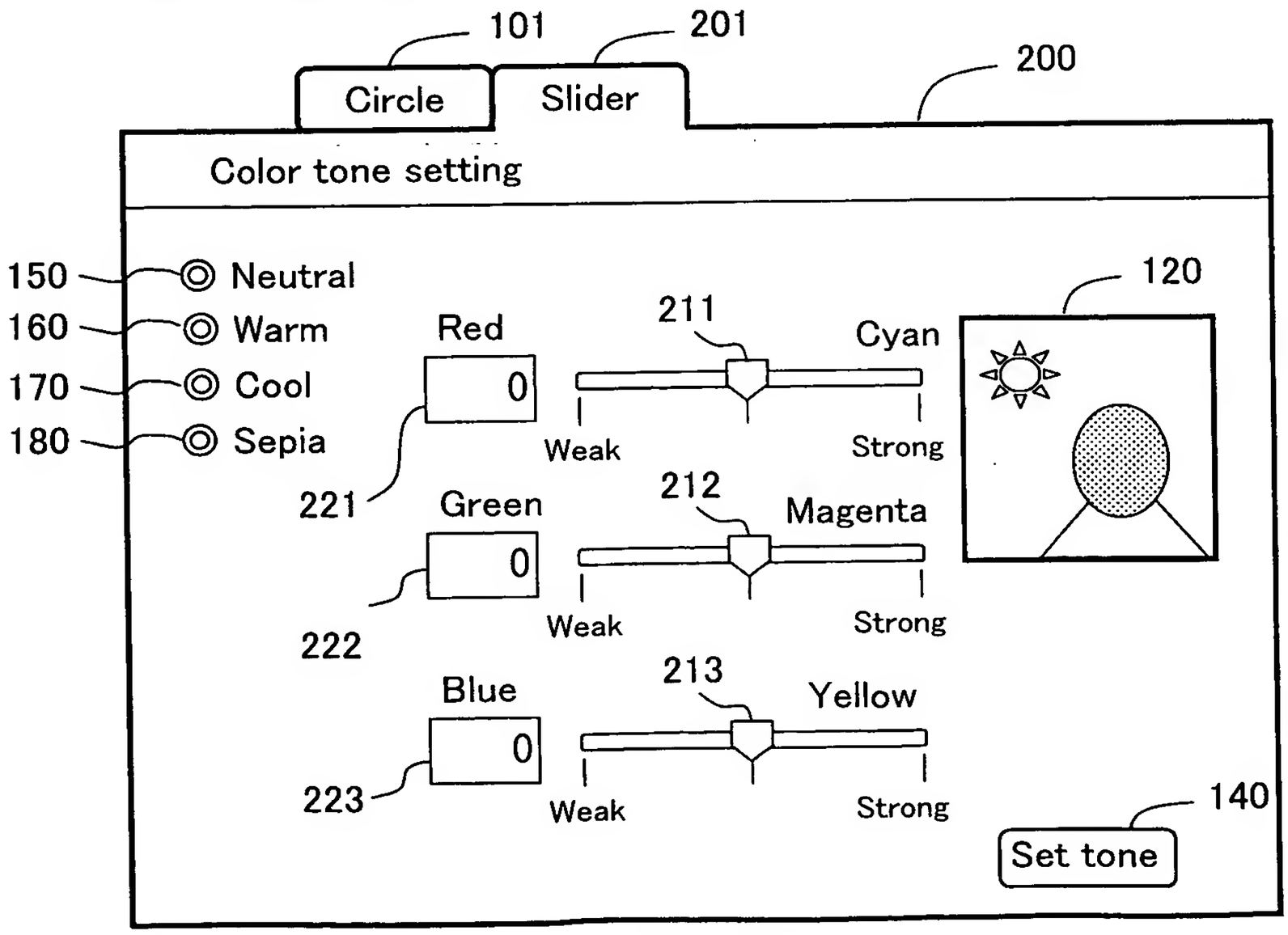
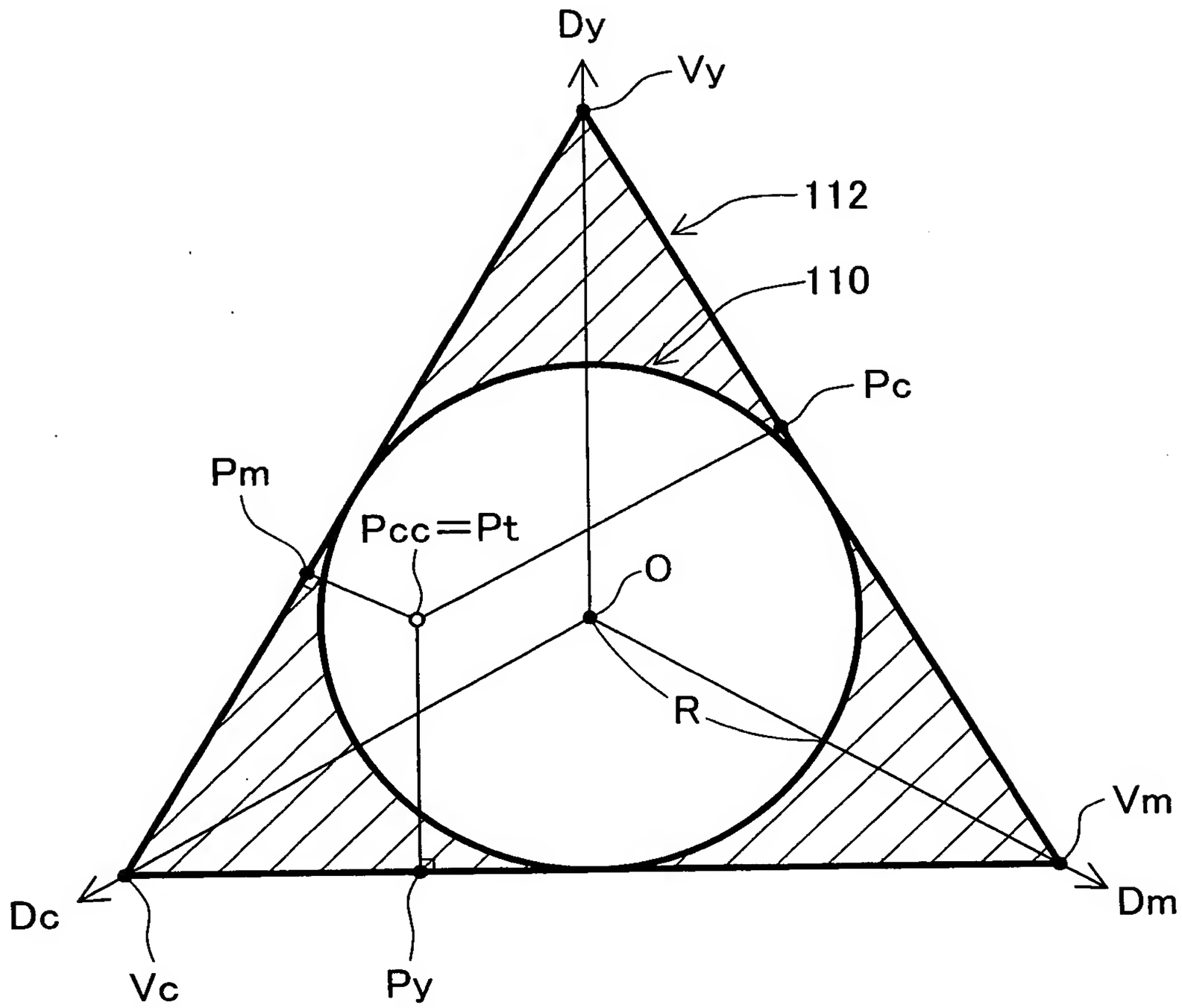


Fig.11



Color component intensity values Ic, Im, Iy for an arbitrary point Pcc (=Pt) in ink color circle

$$Ic = \frac{Qc}{2R}$$

$$Im = \frac{Qm}{2R}$$

$$Iy = \frac{Qy}{2R}$$

$$Qc = \overline{PtPc}\,,\ Qm = \overline{PtPm}\,,\ Qy = \overline{PtPy}$$

Fig.12A

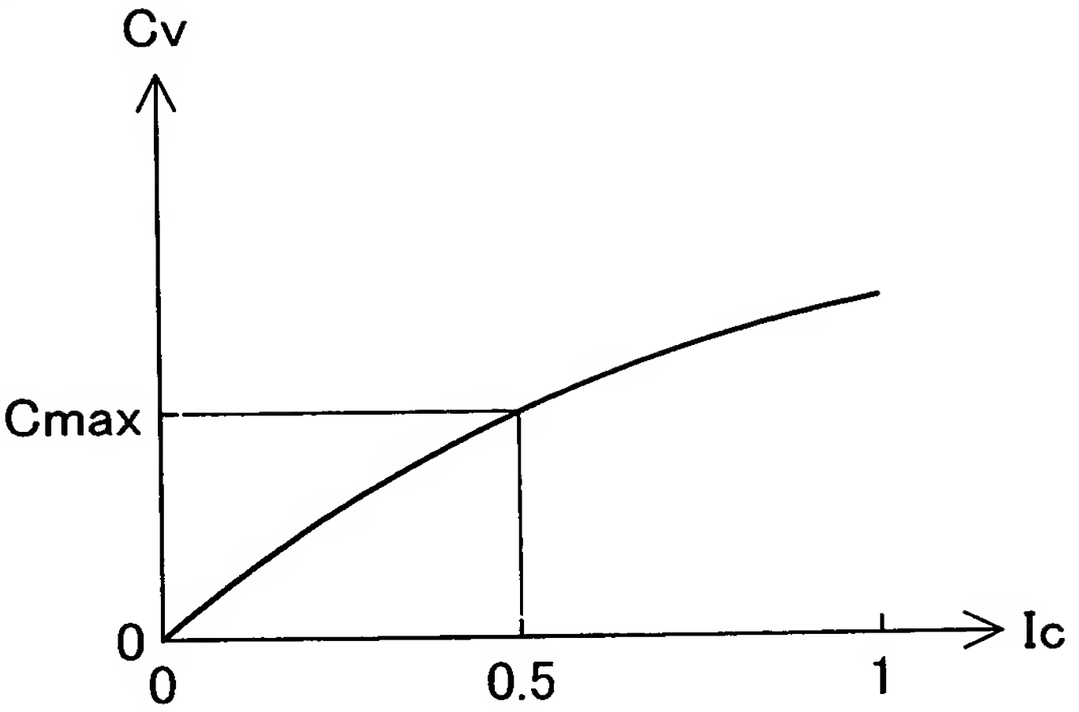


Fig.12B

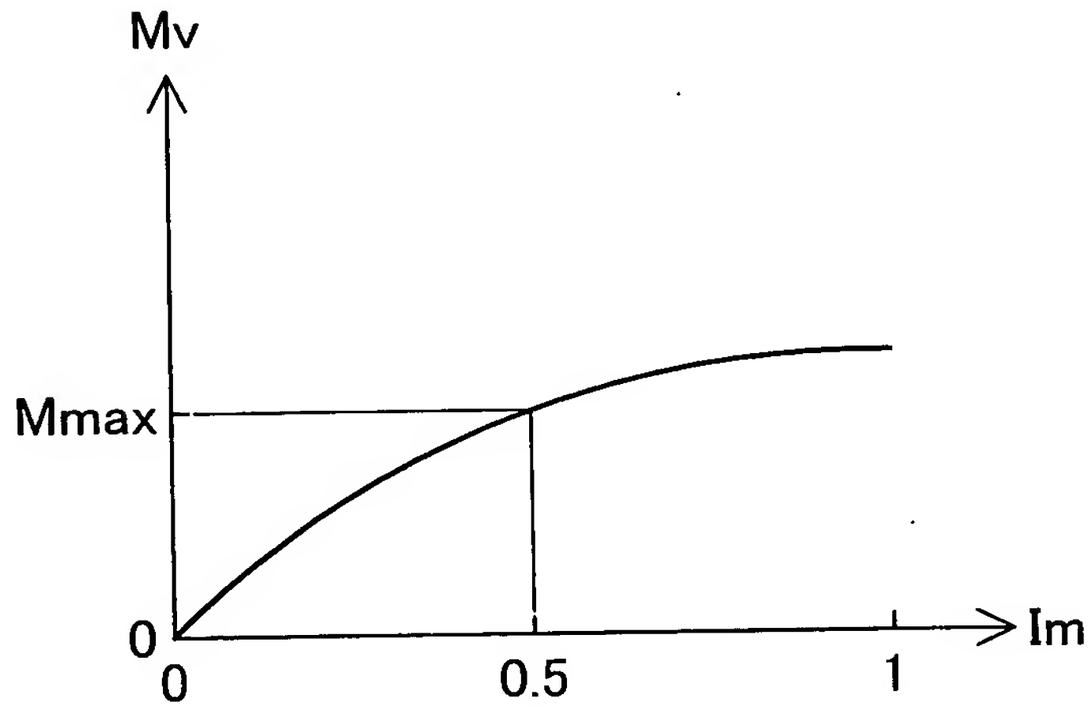


Fig.12C

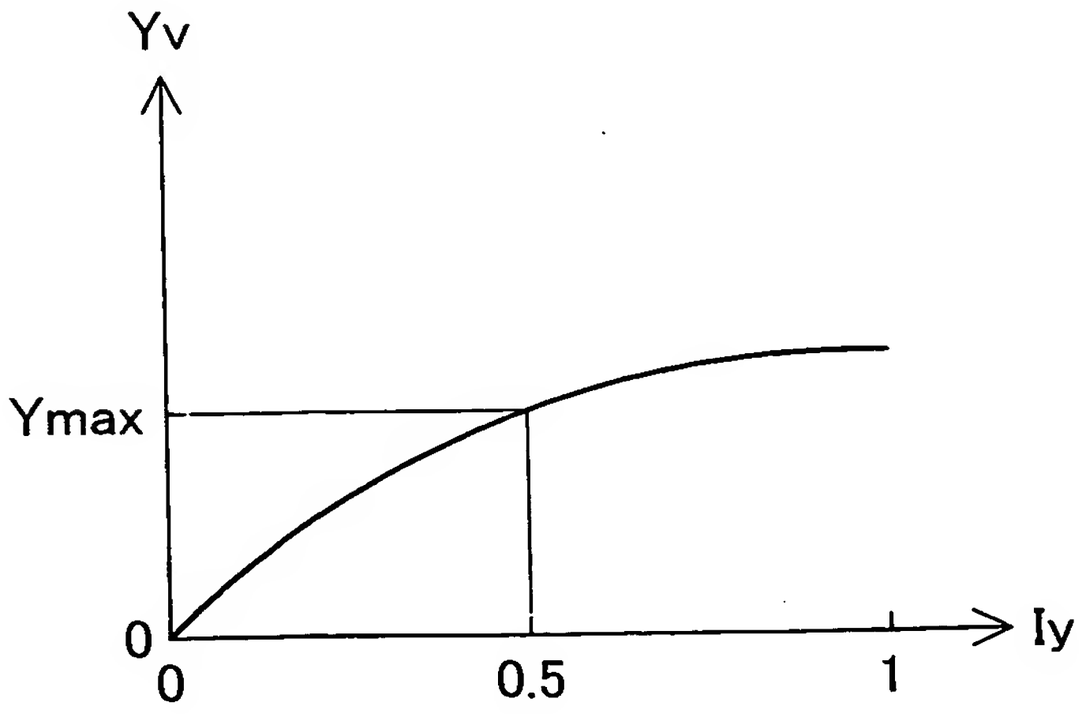


Fig.13

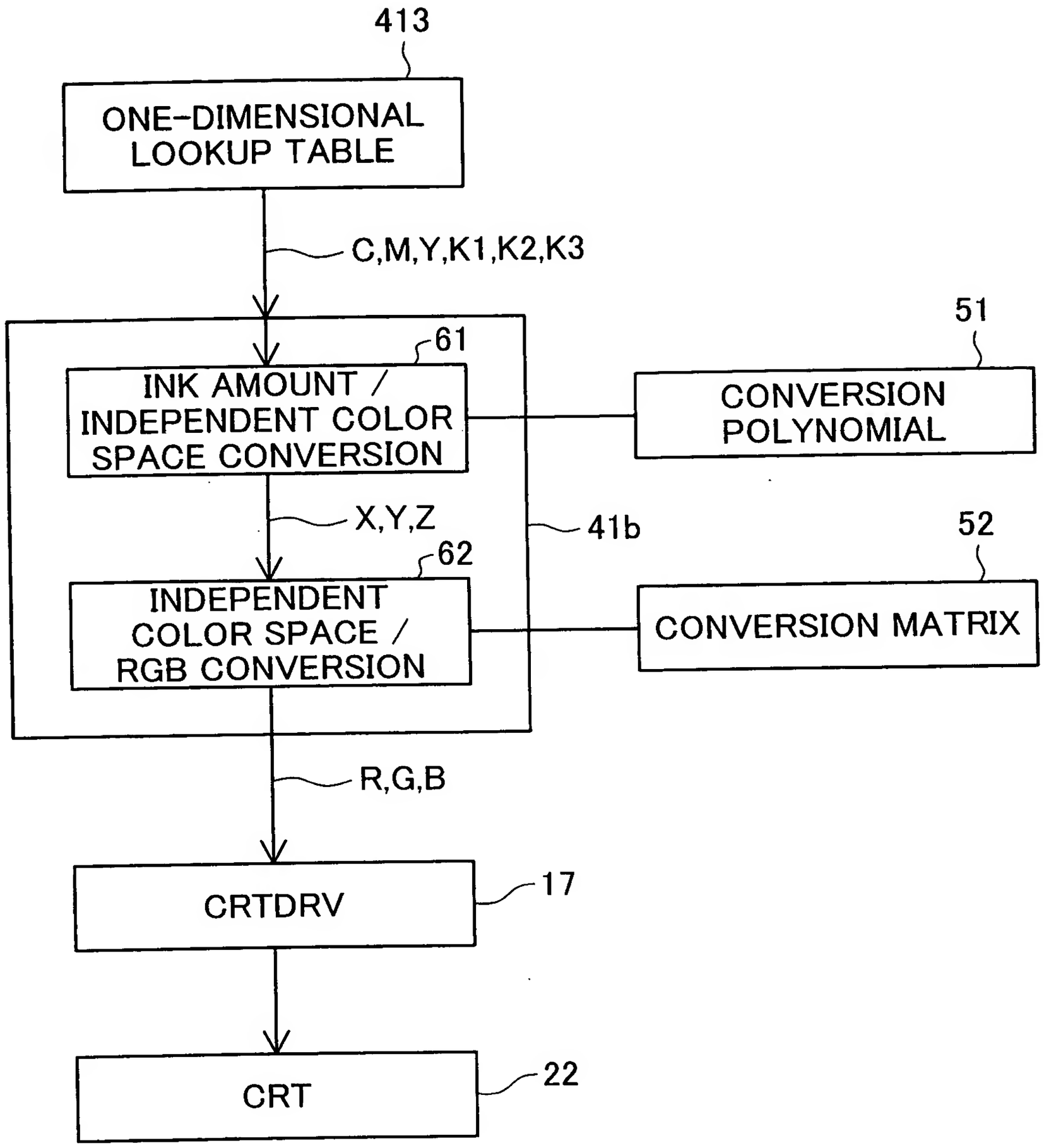

413
ONE-DIMENSIONAL LOOKUP TABLE
C,M,Y,K1,K2,K3
61
INK AMOUNT / INDEPENDENT COLOR SPACE CONVERSION
51
CONVERSION POLYNOMIAL
X,Y,Z
41b
62
INDEPENDENT COLOR SPACE / RGB CONVERSION
52
CONVERSION MATRIX
R,G,B
CRTDRV
17
CRT
22

Fig.14A

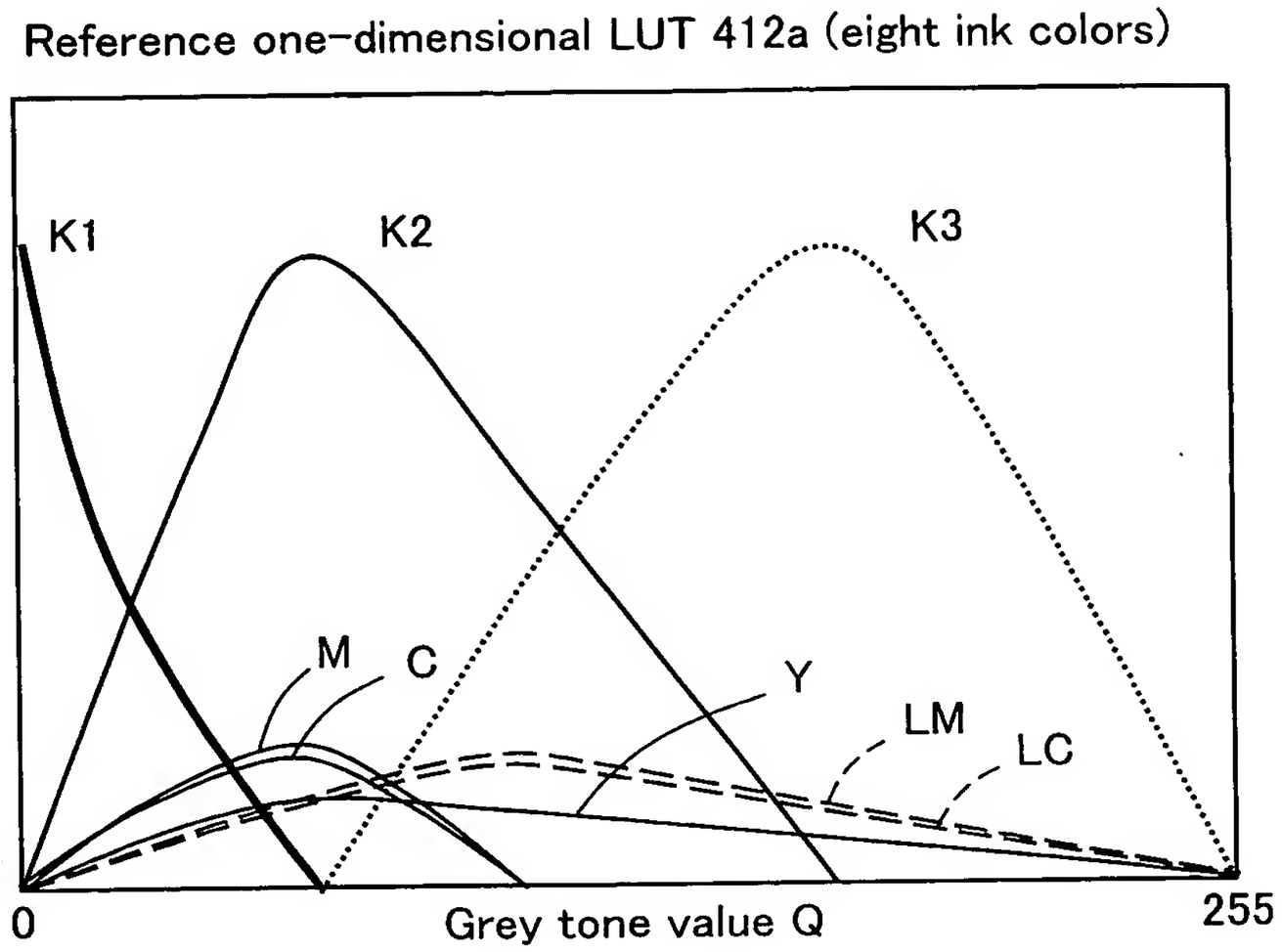
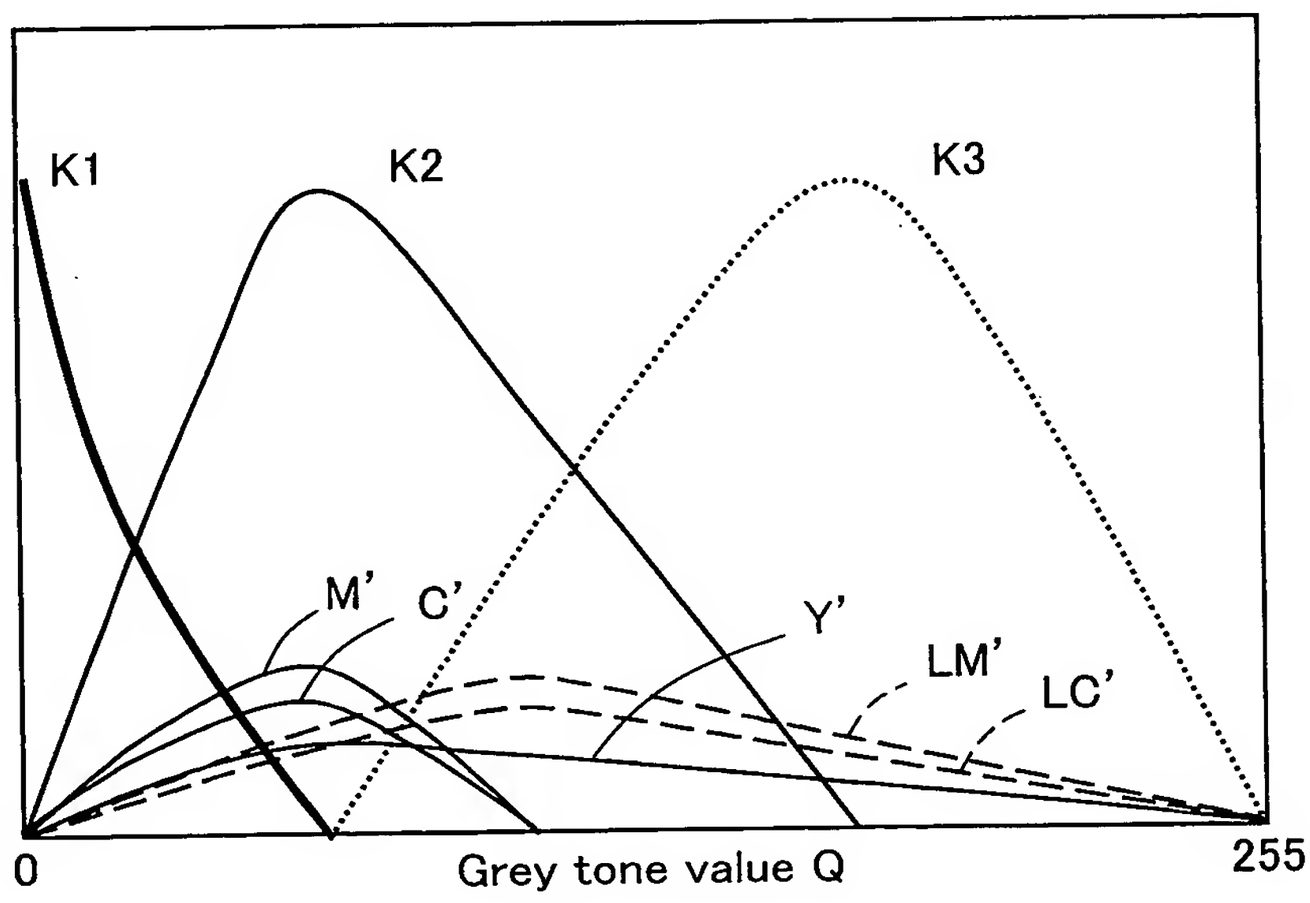


Fig.14B



$$C' = C \times (Cv / Cmax)$$
$$LC' = LC \times (Cv / Cmax)$$
$$M' = M \times (Mv / Mmax)$$
$$LM' = LM \times (Mv / Mmax)$$
$$Y' = Y \times (Yv / Ymax)$$

Fig.15A

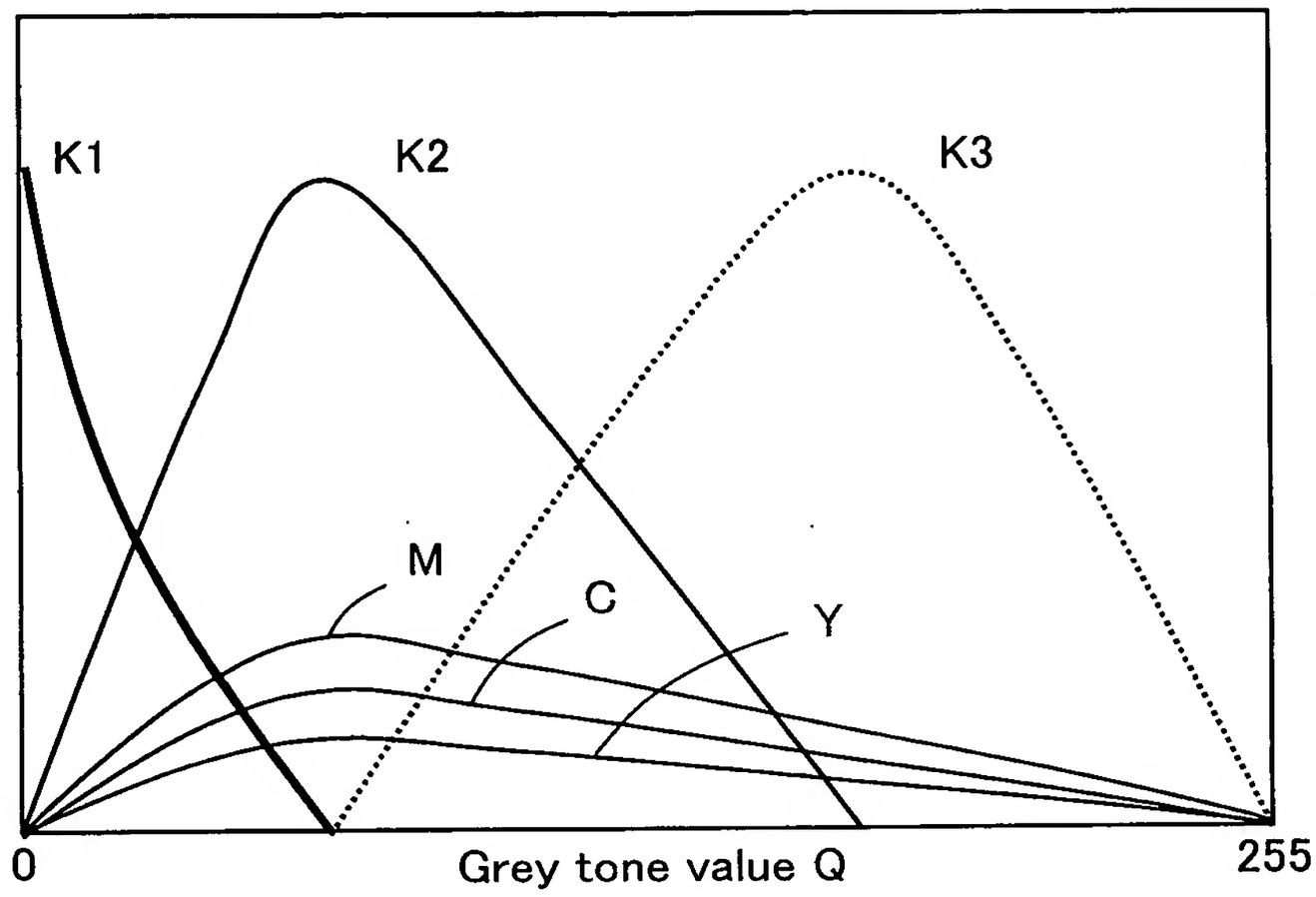
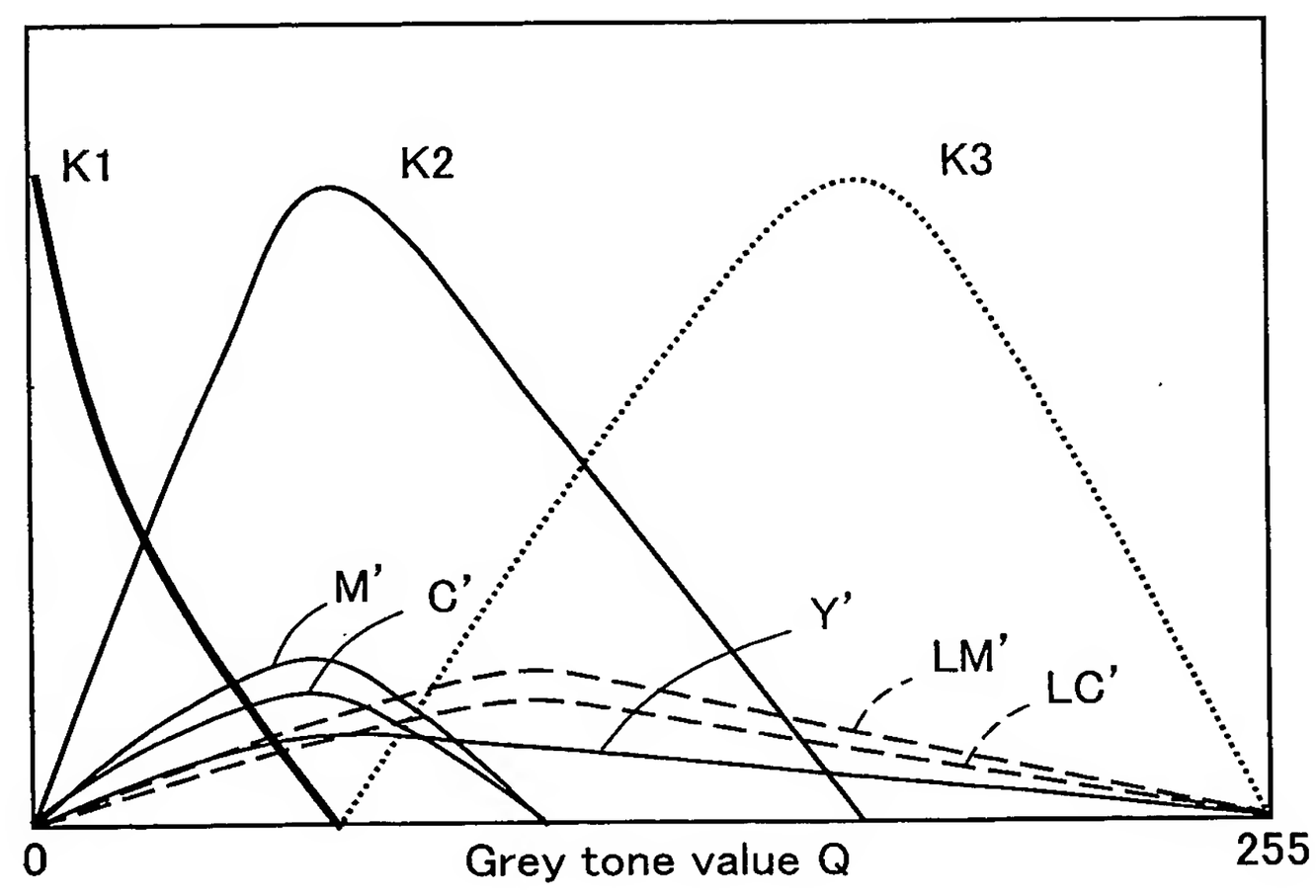


Fig.15B



$$C' = \alpha C \times (Cv/Cmax)$$
$$LC' = k1\ (1-\alpha)\ C \times (Cv/Cmax)$$
$$M' = \beta M \times (Mv/Mmax)$$
$$LM' = k2\ (1-\beta)\ M \times (Mv/Mmax)$$
$$Y' = Y \times (Yv/Ymax)$$

Fig.16

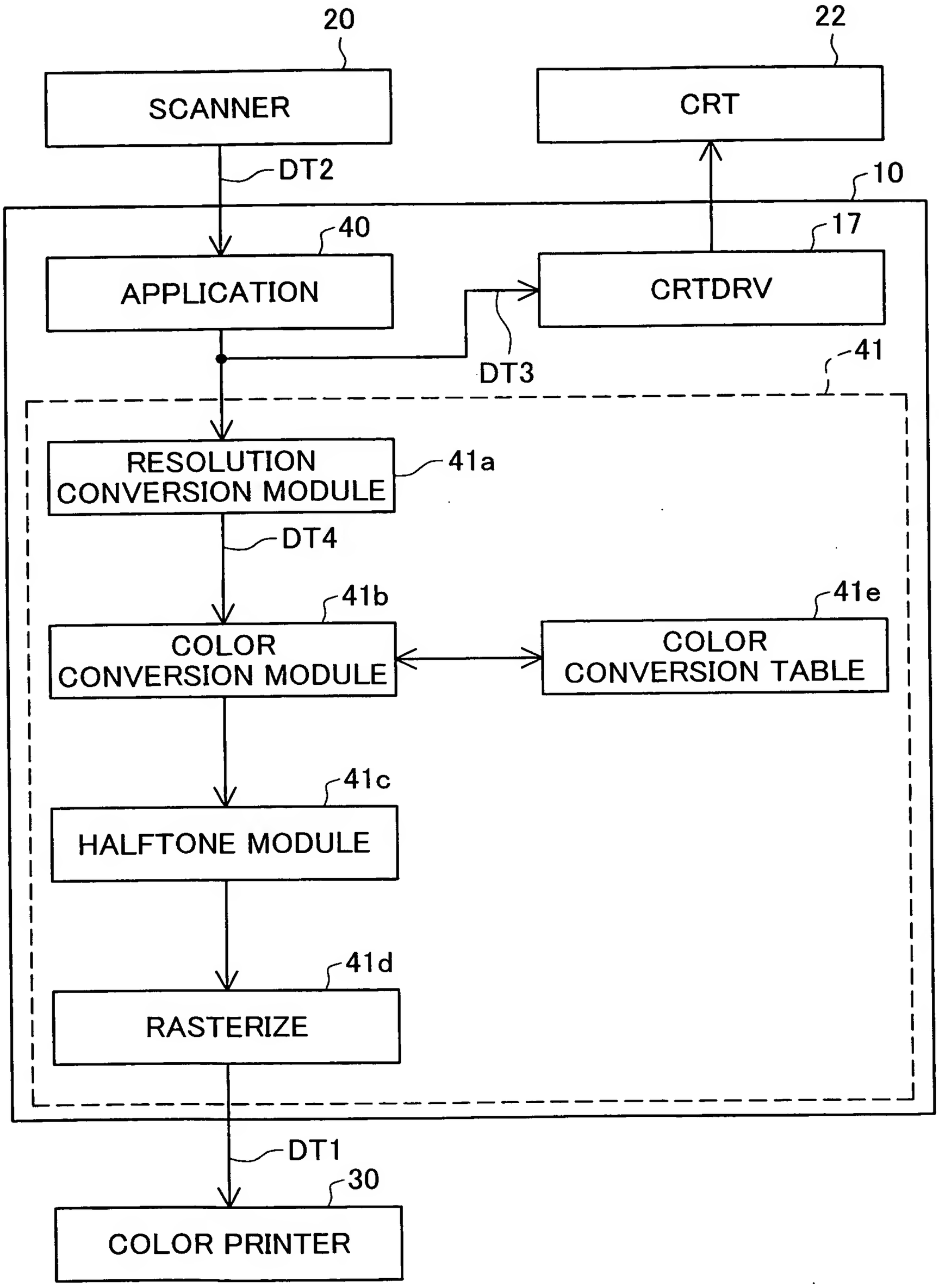

20
SCANNER
22
CRT
DT2
10
40
APPLICATION
17
CRTDRV
DT3
41
RESOLUTION CONVERSION MODULE
41a
DT4
41b
COLOR CONVERSION MODULE
41e
COLOR CONVERSION TABLE
41c
HALFTONE MODULE
41d
RASTERIZE
DT1
30
COLOR PRINTER

Fig.17

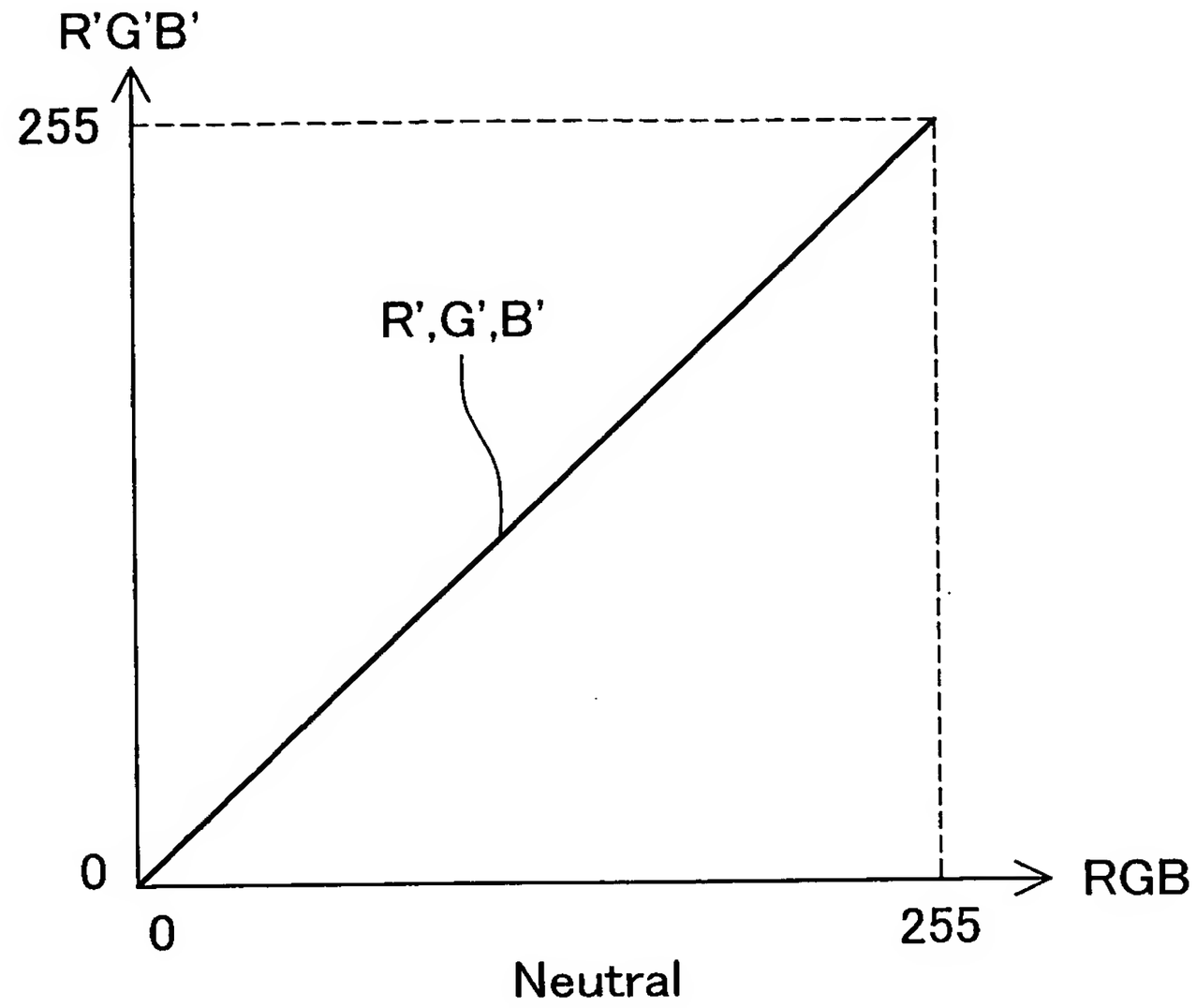


Fig.18

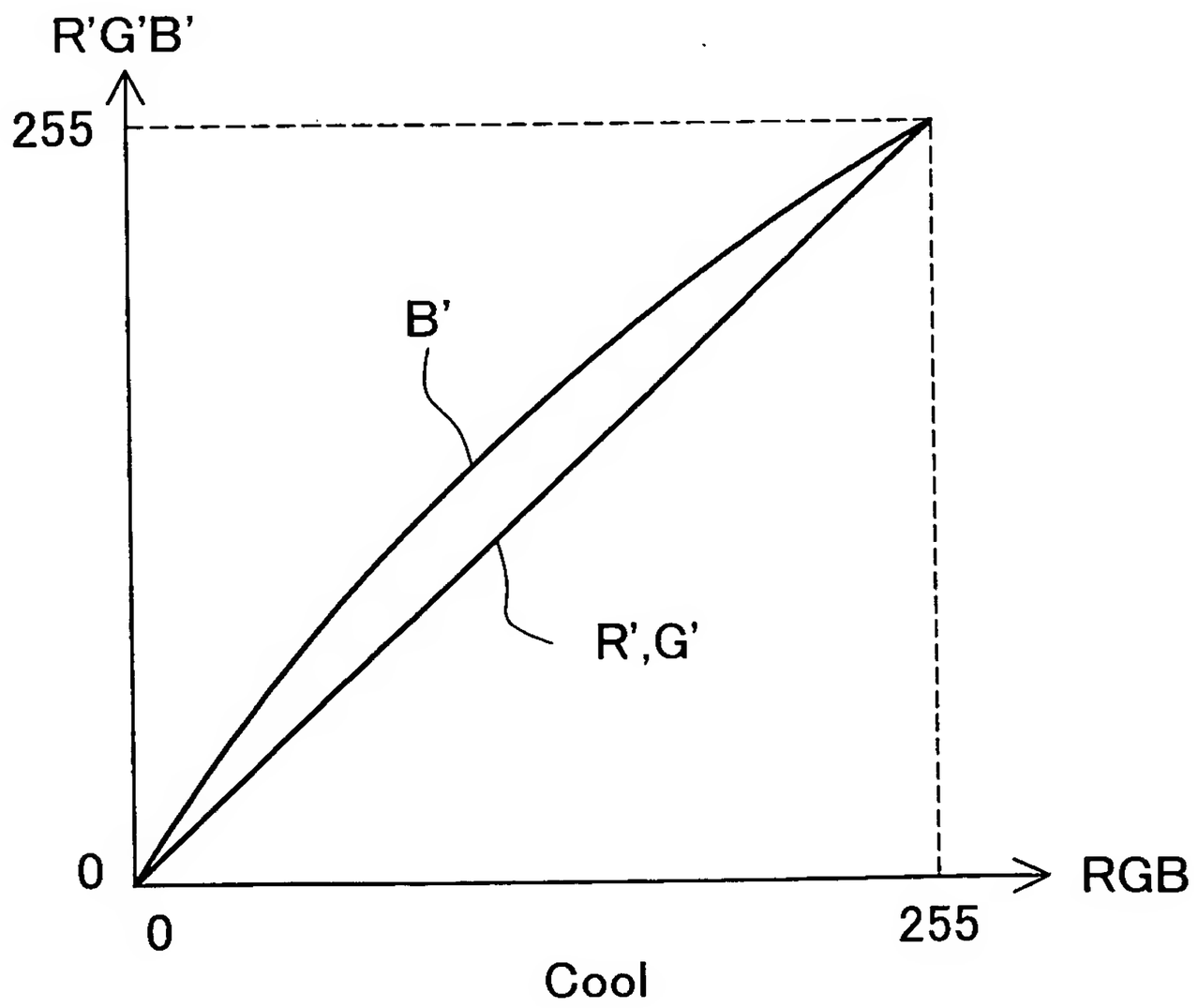


Fig.19

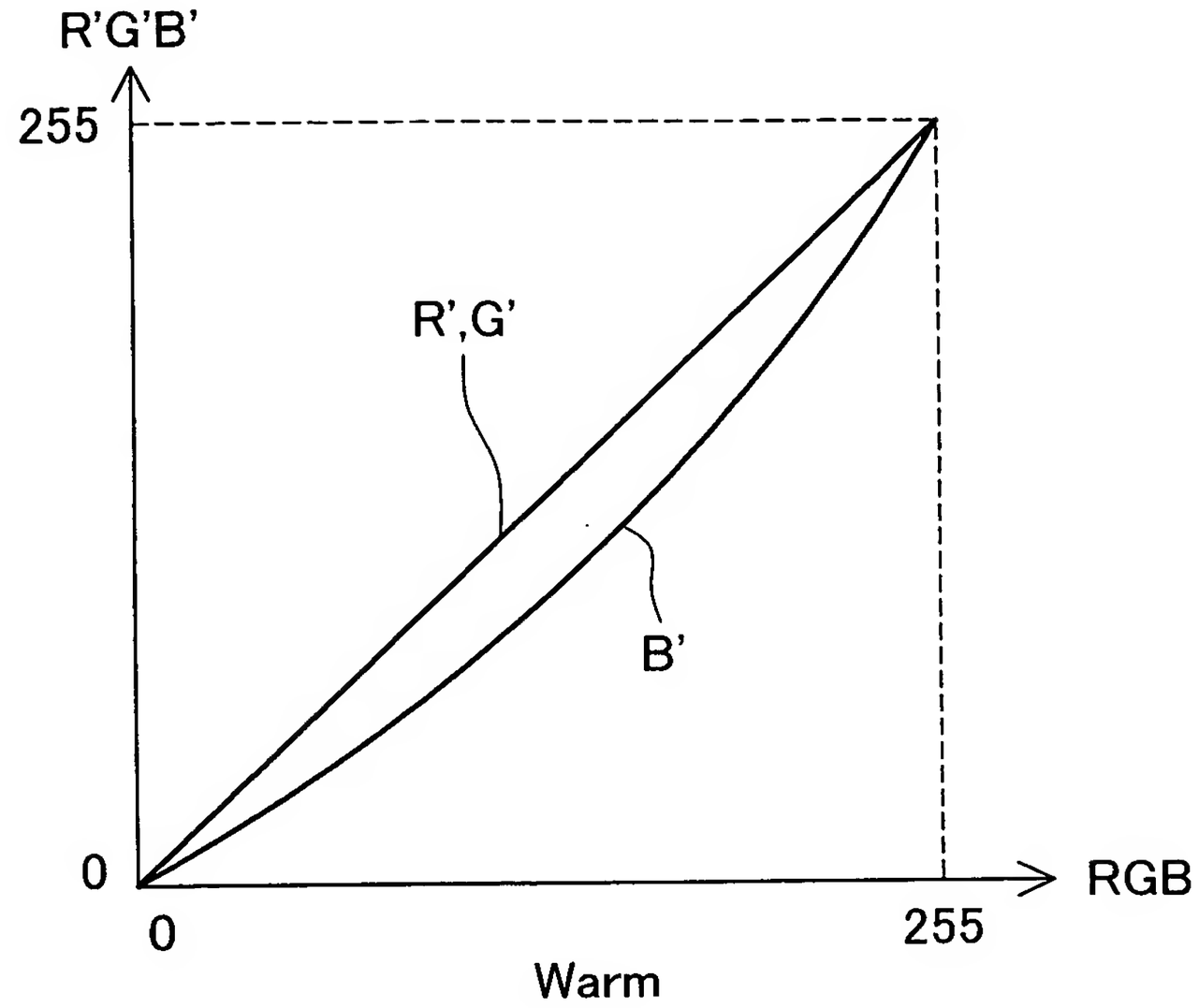


Fig.20

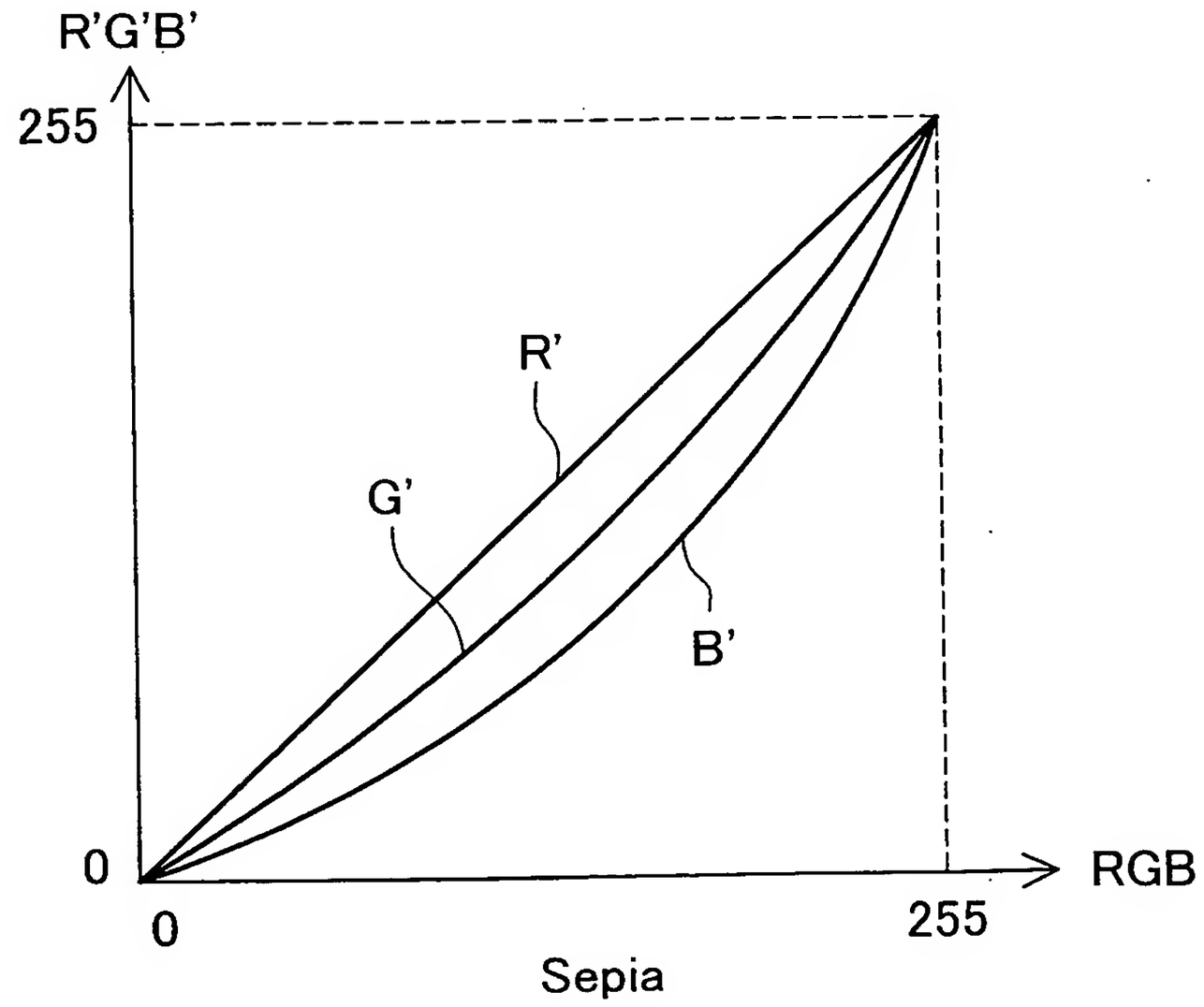


Fig.21